

REMARKS

The present application includes claims 1-22. Claims 1-22 were rejected by the Examiner. Claim 12 has been amended by this response.

By this response, claim 12 has been amended. Claim 12 has been amended to recite that the delay used to produce a delayed copy of the desired signal information is a non-unity delay. The prior art does not teach or suggest the use of a non-unity delay as recited in independent claim 12. The Applicant submits that independent claim 12, as amended, and its dependent claims 13-18 should be allowable.

The Examiner asserts that the “=” sign is missing for equations 3 and 5 on page 9 of the specification. However, as noted in the specification, equations 3 and 5 are simplified equations and thus use the approximately equal symbol, “≈”, rather than the equal sign “=”. Thus, the Applicant respectfully submits that no correction needs to be made.

Claims 1-2, 8, 12, 15, and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagai (U.S. Patent No. 4,486,897) in view of Wang (U.S. Patent No. 6,356,598).

Claims 4, 9-10, 14, 16-17, and 21-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagai in view of Wang and further in view of Kammeyer (U.S. Patent No. 4,506,228).

Claims 3, 5-7, 11, 13, 18, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagai in view of Wang and further in view of Collier (U.S. Patent No. 5,404,405).

The Applicant first turns to the rejection of claims 1-2, 8, 12, 15, and 19 under 35 U.S.C. § 103(a) as being unpatentable over Nagai in view of Wang. Nagai relates to a system for selecting between sound signals broadcast in two different languages, such as English and Spanish (Abstract; column 1, lines 7-17 and 52-62). The sound signals of Nagai include a first sound signal formed by the sum of a first channel signal and a second channel signal, a second sound signal formed by the difference between the first channel signal and the second channel signal, and a third sound signal modulated at a frequency band that does not interfere with the frequency band of the second signal (column 1, lines 63-68; column 2, lines 1-15 and 17-66). Nagai selects between provided signals rather than disclosing improved methods of processing signals. Nagai selects between two bandpass-filtered and FM demodulated signals and a lowpass-filtered signal to provide an output signal (Figures 2-3).

Nagai distinguishes between the previously proposed system of Figure 2 that processes a lowpass-filtered $S_L + S_R$ signal and a bandpass-filtered and FM demodulated signal $S_L - S_R$ using a matrix circuit to output separate left channel (S_L) and right channel (S_R) signals (see equations 1 and 2, column 3, lines 16-37; Figure 2). The monaural second language sound (S_{I2}) is provided through a bandpass filter and an FM demodulator. Nagai notices that the prior art used two FM demodulators and introduced

a switch before the matrix circuit to provide either the S_L - S_R signal or the S_{12} monaural second language signal to the FM demodulator for introduction to the matrix circuit (Figure 3; column 3, lines 47-64).

A comparison between Figures 1-3 of Nagai and Figures 1-3 of the present application, as well as the specifications of the respective applications, demonstrates that the claims of the present application are distinct from the disclosure of Nagai. Nagai does not teach or suggest use of a delayed signal and a Hilbert filtered signal in FM demodulation. These limitations are recited in independent claims 1, 12, and 19 of the present application. Rather, Nagai discusses use of a matrix or selector switch to select between a lowpass filtered signal and a bandpass filtered and FM demodulated signal to form a center frequency (See Figures 2 and 3; Abstract; and column 2, lines 3-15). While Nagai discusses a system for providing either stereo sound in a first language or monaural sound in a second language (Abstract; column 1, lines 57-68 and column 2, lines 1-15), the claims of the present application provide a system and method for improved demodulation of secondary audio program and other digital signal information using a bandpass filter, a Hilbert filter, and an FM demodulator. Nagai does not teach or suggest either the improved system or the improved method recited in independent claims 1, 12, and 19 and their corresponding dependent claims.

Wang relates to increasing the effectiveness of NTSC co-channel interference detection with a high definition television (HDTV) signal (Abstract; column 8, lines 1-6 and lines 30-46). Wang demodulates an HDTV signal from a pilot carrier signal and does not contemplate a second audio program signal or additional information (Abstract;

column 1, lines 34-38; column 2, lines 4-17). Figures 1 and 3 of Wang illustrate a HDTV signal processing receiver system that does not teach or suggest the simplified secondary audio program demodulation system of the pending claims. In Wang, the Hilbert filter and delay unit are part of a specific digital demodulator and are fed into a multiplier in the demodulator which produces a complex baseband signal, which is output from the demodulator (column 3, lines 60-67 and column 4, lines 1-8). The demodulator of Wang neither produces nor discusses a secondary audio program signal.

Thus, Wang does not teach or suggest a system or method for demodulation of secondary audio program information. This limitation is recited in independent claims 1 and 19 of the present application. Rather, Wang does not envision a secondary audio program but instead seeks to improve co-channel interference detection HDTV signal. Additionally, Wang does not teach or suggest using a bandpass filter, a Hilbert filter, and an FM demodulator as recited in independent claims 1 and 19 of the present application. Wang does not teach or suggest using a bandpass filter and Hilbert filter with a minimal number of coefficients along with a simple approximation for FM demodulation as recited in independent claim 19. Although there is no suggestion in the art to combine the language selection system of Nagai with the HDTV system of Wang and as shown above, even combining Nagai with Wang would not teach or suggest the limitations of independent claims 1 and 19 or their dependent claims 2-11 and 20-22, respectively.

Additionally, Wang does not teach or suggest isolating desired signal information, phase shifting a copy of the desired signal information, delaying a copy of the desired signal information using a non-unity delay, and FM demodulating the desired signal

information using the phase shifted copy and the delayed copy to produce an FM demodulated signal. These limitations are recited in independent claim 12 of the present application. Combining Wang with Nagai for the sake of discussion still does not teach or suggest the limitations of claim 12 or its dependent claims 13-18.

Thus, the Applicant respectfully submits that the Examiner's rejection of claims 1-2, 8, 12, 15, and 19 has been overcome, and claims 1-2, 8, 12, 15, and 19, and remaining dependent claims 3-7, 9-11, 13-14, 16-18, and 20-22 should be allowable.

Next, the Applicant turns to the rejection of claims 4, 9-10, 14, 16-17, and 21-22 under 35 U.S.C. § 103(a) as being unpatentable over Nagai in view of Wang and further in view of Kammeyer. As discussed above, neither Nagai nor Wang, alone or in combination, teaches or suggests the limitations of the claimed invention. Kammeyer relates to an FM digital demodulator. Kammeyer does not contemplate separating a secondary audio program or other data. Furthermore, the addition of a lowpass filter in combination with Nagai and Wang does not teach or suggest all of the limitations of dependent claim 4. Additionally, looking at Figures 1-8 and the accompanying description (such as column 3, lines 49 through column 6, line 63), the discussion of Kammeyer relates to a different digital frequency demodulator and not the system and method claimed in the present application. For example, the simplified demodulation of claims 9 and 16 and the equation of claims 10, 17, and 22 neither taught nor suggested anywhere in Kammeyer (or Nagai or Wang).

Kammeyer does nothing to cure the deficiencies of Nagai and Wang with respect to the claims of the present application. The theoretical combination of Nagai, Wang, and Kammeyer does not teach or suggest the limitations of the claimed invention. Therefore, claims 4, 9-10, 14, 16-17, and 21-22, as well as remaining claims 1-3, 5-8, 11-3, 15, and 18-20, should be allowable.

Next, the Applicant turns to the rejection of claims 3, 5-7, 11, 13, 18, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Nagai in view of Wang and further in view of Collier. As discussed above, Nagai and Wang, taken alone or in combination, do not teach or suggest the limitations of the claimed invention. Collier relates to FM stereo decoding using a phase locked loop (Abstract; column 1, lines 62-66). Collier regenerates a 38 kHz subcarrier from a 19 kHz pilot signal while maintaining exact phase coherence between the signals (column 1, lines 67-68 and column 2, lines 1-2). Collier does not cure the defects in Nagai and Wang, and the theoretical combination of Nagai, Wang, and Collier does not teach or suggest the limitations of the claimed invention. Therefore, claims 3, 5-7, 11, 13, 18, and 20, as well as remaining claims 1-2, 4, 8-10, 12, 14-17, and 19-22, should be allowable.

Thus, the Applicant respectfully submits that the cited prior art does not teach or suggest the limitations of the claimed invention in their entirety. Therefore, the Applicant respectfully submits that claims 1-22 should be allowable.

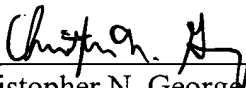
CONCLUSION

The Applicant respectfully submits that the present application is in condition for allowance. The Applicant thanks the Examiner for his work in examining the application and the prior art. If the Examiner has any questions or the Applicants can be of any assistance, the Examiner is invited and encouraged to contact the Applicants at the number below.

The Commissioner is authorized to charge any necessary fees or credit any overpayment to the Deposit Account of MHM, Account No. 13-0017.

Respectfully submitted,

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